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CAUSE AND COST OF PRODUCTION DELAY AT HARDWOOD CIRCULAR SAWMILLS IN KENTUCKY AND OHIO

The number of operating sawmills in Kentucky has decreased 75 percent since 1947.[1] Two reasons often given for this decline are the steady rise in production costs in the face of relatively stable lumber prices--the cost-price squeeze--and competition from wood substitutes.

There is no apparent indication of change either in the cost-price situation or the competition from nonwood material producers, so the sawmill operator must search for ways of reducing costs if he is to remain competitive. And one way to reduce production costs is to reduce the number and duration of production delays.

Study Methods

To learn the causes and cost of lumber production delays at hardwood circular sawmills in the hill country of southern Ohio and eastern Kentucky, seven such mills were selected for study. At each study mill continuous time records were made daily, starting when the mill employees reported for work and ending when they were dismissed. The normal workday at most mills was 8 hours. For this study, the head saw and sawyer were considered the key machine and employee so, once the employees reported for work, any stopping of the head saw was recorded as a delay in production.

1/ Wray, Robert D. Forestry research in the Blue Grass State. North. Logger 30(9): 30-31, 50-51, illus. 1965.

Two types of production delays were recognized: presawing production delays--the interval between the time that millworkers reported for work and the time the head saw started--and head saw production delays which included all other delays. The length of each production delay was recorded to the nearest second and the volume of lumber produced during the time-study period was recorded to the nearest board foot. The following causes of head saw production delays were recognized: Faulty waste disposal system; equipment repair; equipment adjustment and maintenance; sawyer delay; break period; log and lumber flow stoppages; saw filing; changing saws; other causes.

Hourly cost rates were determined for each study mill. Only those costs incurred solely to produce lumber were used in the analysis. Other costs, such as power unit electricity or fuel costs, although incurred for production, were excluded from the analysis because such costs normally do not occur when the head saw is inoperative. Cost items used in the analysis were: depreciation, insurance, heating fuels, lubricants, repair and maintenance, taxes, interest on borrowed money, labor, electricity (lighting), supplies, and workmen's compensation. The hourly cost of delay time was computed using (1) overhead costs based on 2,000 hours of operation for 1961 or 1962; (2) operating costs, excluding labor, based on head saw operating time for 1961 or 1962; and (3) labor costs measured at the time of the study.

Results

Production delays at the study mills ranged from 8 percent of total possible production time to 26 percent, averaging 16 percent for all mills (fig. 1). Of this average production delay, 6 percent was attributable to presawing delay and 10 percent to head saw delay.

The causes for head saw delay varied from mill to mill but faulty waste disposal systems, equipment repair, and equipment adjustment and maintenance caused delays at every mill. For all mills combined, equipment repair amounted to 16 minutes per mill per day or 30 percent of the total head saw delay time (table 1). Saw filing accounted for 15 percent of the delay time. However, all of the head saw delays for filing occurred at two mills because the other five mills did their saw filing during nonproductive hours.

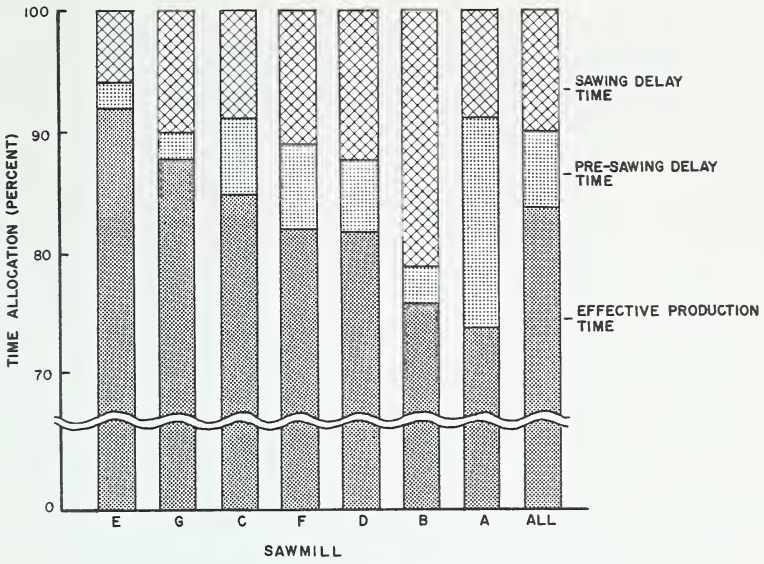

FIGURE 1.--Allocation of lumber production time at seven selected sawmills.

Table 1.--Cause of head saw delay

(In percent of delay time)

Saw-mill	Faulty waste disposal system	Equip-ment repair	Equipment adjustment & main-tenance	Change head saw	Poor log & lumber flow	Saw-yer delay	Break period	Saw fil-ing	Other
A	15	18	14	0	0	41	8	0	4
B	12	42	7	2	26	0	10	0	1
C	12	27	20	18	6	17	0	0	0
D	4	58	7	13	2	10	2	0	4
E	5	3	11	31	29	1	20	0	0
F	1	9	3	0	13	1	2	71	0
G	4	29	13	18	1	9	0	26	0
Aver-age	7	30	10	11	11	10	5	15	1

Total cost of production delays ranged from $0.89 per hour of operation to $4.56, averaging $2.53 for all mills (table 2). The variation in delay costs among study mills resulted not only from mill-to-mill differences in amount of production delay but also from differences in operating costs.

Table 2.--Cost of production delays at the study mills

Sawmill	Daily output	Cost of production delay per hour operation: Presawing delay	Head saw delay	Total delay
	Board feet			
A	5,720	$1.31	$0.73	$2.04
B	9,960	.53	4.03	4.56
C	15,520	1.79	2.66	4.45
D	11,910	.97	1.88	2.85
E	9,530	.22	.67	.89
F	7,530	.50	.79	1.29
G	14,000	.32	1.35	1.67
Average	10,595	$0.80	$1.73	$2.53

Combining hourly cost of production delays at each study mill with the number of hours each mill operated per year indicated that annual delay costs ranged from $1,340 to $9,120, averaging $4,300 for all mills.

Production delays increase costs per thousand board feet because overhead costs and some operating costs, particularly labor, continue during nonproductive delay time. This cost increase at the study mills averaged $2.00 per thousand board feet, ranging from $0.75 per thousand board feet to $3.79. Delay cost in this case represents the difference between cost per thousand board feet with production delays and the corresponding cost under the assumption of no delays.

Conclusion

In actual practice, all production delays cannot be avoided, i.e., there will always be some unforeseen and unavoidable delays. However, the cumulative effect of delays can be costly and underscores the importance of eliminating all avoidable delays even though, individually, they may not be longer than a few minutes. Some examples of avoidable delays would be (1) replacing sawdust blower that is causing frequent downtime; (2) replacing worn belts that need frequent repairs; and (3) looking for faulty or worn parts where equipment needs frequent adjustment.

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